Comparing the Interfirm Relations in Motorcycle Industry in China, Taiwan, and India

AUTHOR(S):

Ohara, Moriki

CITATION:

Ohara, Moriki. Comparing the Interfirm Relations in Motorcycle Industry in China, Taiwan, and India. 經濟論叢 2008, 182(2): 257-278

ISSUE DATE:

2008-08

URL:

https://doi.org/10.14989/151282

経済論叢（京都大学）第182巻第2号，2008年8月

Comparing the Interfirm Relations in Motorcycle Industry in China, Taiwan, and India

Moriki Ohara

I Introduction

This paper compares and figures out the characteristics of the interfirm relations which have been formed between the major indigenous motorcycle manufactures and their major components suppliers in China, Taiwan, and India.

In Ohara [2001], the author has exemplified the clear difference in the patterns of forming interfirm relations between the final motorcycle manufactures (hereafter, maker) and their important first tier network firms that supply important parts to the maker (hereafter, supplier) in Japan and China. In Japan, manufactures have formed "integrated-type" (or "united-type") interfirm relations, whereas in China, major indigenous makers and suppliers have formed "dispersed-type" (or "isolated-type") relations (which will be described later) (see also Ohara [2006]).

However, the study has a significant weakness in explaining the causes of such difference. By directly comparing firms in Japan, an advanced economy, and China, developing country, it can not tell whether this gap has been caused mainly by their difference in their sheer developmental stages, or by other factors rooted in the inherit characteristics of their economic systems.

This paper aims to make up for this weakness by comparing China with India, whose positions in the stages of economic development is similar to China than Japan. Including another late-industrializer, Taiwan, may also help us to check the problem.

This study shows, in conclusion, that as far as the type of interfirm relations is concerned, Chinese firms have followed very different development paths in motorcycle industry, whereas Taiwan an India seem to have followed more similar path to Japanese counterparts.

The background interest behind the study is to find out the diversity in the patterns of late-industrialization among these countries and the main causes that brought about them. The result of this paper will provide one of necessary bases for our future challenges for the theme.

II Data and Interviewed Firms

Concerning China, we mainly observed China Jialing Industrial Co., Ltd (hereafter, Jialing) and Chongqing Zongshen Motorcycle Group (hereafter, Zongshen), and 14 suppliers (7 for Jialing and 7 for Zongshen) that had/have specifically important relationships with them. Jialing is a state-owned large maker that initiated the development of Chinese motorcycle industry, as a pioneer and largest maker, in 1980s and early 1990s. Jialing deteriorated its market performance in the latter half of 1990s, however, in the former half of the first decade after the year 2000, it recovered until it became China's second largest maker (in production). Zongshen is a young maker which was established in early 1990s, and it is one of the most typical and successful privately-owned makers that grew very rapidly in the late 1990s by purchasing and assembling external standardized parts of existing dominant models. Jialijng represents traditional

state-owned large makers that used to form an integrated interfirm organization in 1980s, whereas Zongshen represents new makers that utilized dispersed interfirm relations in 1990s. The author conducted surveys on these two makers and their suppliers twice, firstly in 1998-99 and secondly in 2002-04, and observed the changes during the interval period (Ohara [2006]).

Concerning Taiwan, Kwangyang Motor Co., Ltd.(hereafter, KYMCO) and its 6 important suppliers were observed in 2004 and 2005. 4 out of the 6 suppliers surveyed were capitally affiliated by KYMCO. In Taiwan, Yamaha Motors Taiwan Co., Ltd.(hereafter, Taiwan Yamaha) and its important suppliers were also surveyed to make a comparison with KYMCO.

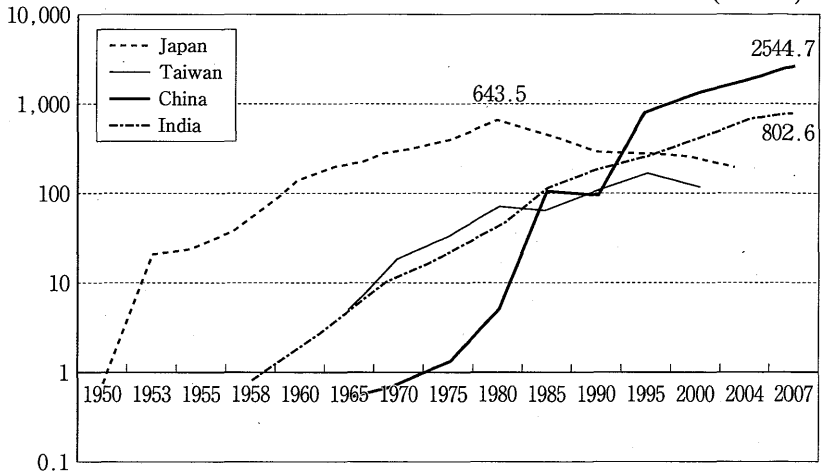
In India, Bajaj Auto Ltd. (hereafter, Bajaj) and its 7 important suppliers were surveyed. For a comparison, Hero Honda Ltd. (a maker capitally affiliated by Honda, hereafter, Hero Honda) and related suppliers were also surveyed.

In Taiwan and India, we surveyed the latest status and changes since 1990s. The status of interfirm relationship before 1990s was not directly observed this time but related questions on the status then were also asked during the interviews. An outline of surveyed firms is presented in the Appendix.

III Overview of the Motorcycle Industry in Three Countries

Almost 90% of world motorcycles are now produced and consumed in Asia (production-unit-wise), and 25 million motorcycles, more than a half of them, are produced in China, and 8 millions, about 1/4 of them, are produced in India in 2007 (Figure 1). While the size of motorcycle pro-

Figure 1 Motorcycle Production of China, India, and Taiwan (1000 unit)



Note : Y-axis is in Logarithm

Sources : ZQGNB (various years), CCYAH (1998) Shih and Chen (2004), and SIAM (various years), Honda (various years)

duction in Taiwan is not large (about 1.5 million), but its penetration per capita is the world highest.[1] These three countries occupy critical and unique positions in world motorcycle industry.

It should be noteworthy that, in these countries, indigenous makers stand in the leading position in the industry in each country (Table 1). In Taiwan, KYMCO, Sanyang Motor Co., Ltd.(hereafter Sanyang), and Taiwan Yamaha occupy about one third of market share each, with the sum of their shares exceeding 90%. KYMCO, along with Sanyang, is the oldest motorcycle maker in Taiwan. In India, there are more large motorcycle makers than Taiwan, but 75% of the market share is still occupied by top 3 makers. Bajaj is India's oldest and most leading motorcycle maker, and, though it was overtaken by Hero Honda in mar-

1) Every 1.9 person owns one motorcycle on average.

Table 1 Motorcycle Manufactures in China, Taiwan, and India (2003)

		Chief Makers	Foreign capital share	Production (1000 unit)	Domestic market share (%)
China	1	Grand River Group Co. Ltd (Grand River)		1,009.0	6.9
	2	China Qianjiang Group Co., Ltd		981.0	6.7
	3	China Jialing Industrial Co., Ltd (Jialing)		969.0	6.6
	4	Chongqing Lifan Industry (Group) Co., Ltd.		826.0	5.6
	5	Loncin Holdings Ltd.		818.0	5.6
	6	Sundiro Honda Motorcycle Co. Ltd.	Honda 50%	788.0	5.4
	7	Chongqing Zongshen Motorcycle Group (Zongshen)		780.0	5.3
		about 150 other makers (registered)			57.9
Taiwan	1	Sanyang Industry Co., Ltd (SYM)		468.0	34.9
	2	Kwang Yang Motor Co., Ltd (KYMCO)		411.0	30.6
	3	Yamaha Motor Taiwan Co., Ltd.	Yamaha 51%	326.0	24.3
	4	Tai Ling Motor Co., Ltd	Suzuki 40%	85.0	6.3
	5	Her-Chee Industrial Co., Ltd.		26.0	1.9
	6	Motive Power Industry Co., Ltd.		25.0	1.9
		a few other makers			0.1
India	1	Hero Honda Motors Ltd.	Honda 26%	2,033.0	36.7
	2	Bajaj Auto Ltd. (Bajaj)		1,198.0	21.6
	3	TVS Motor Company Ltd.		893.0	16.1
	4	Honda Motorcycle & Scooters Ltd.	Honda 100%	310.0	5.6
	4	Yamaha Motors India Ltd	Yamaha 100%	232.0	4.2
	5	LML Limited		196.0	3.5
	6	Kinetic Engineering Ltd.		141.0	2.5
		a few other makers			9.7

Sources : ZQGNB (2004), Shih and Chen (2004), and SIAM (2004).

ket share from the mid 1990s, Bajaj is still no. 2 and is increasing its market share steadily in recent years.

The picture of the Chinese motorcycle industry is very different from Taiwan and India. There are more than 150 officially-registered makers and their market share is very dispersed. No single firm has large enough market share to influence the rest. Jialing used to have as large share as

around 1/4 until early 1990s. At that time, 80% of the market had been occupied by 10 largest firms, and all of them were state-owned firms. However, as domestic market expanded in an unprecedented pace in mid 1990s, many new makers competitive in price, including Zongshen, emerged and many of traditional state-owned makers including Jialing declined not only in market share but also in absolute production size. It is noteworthy that, only in China, the share of Japanese-affiliated makers is very minor (the total sum of the shares of 9 Japanese-affiliated makers in China is as small as 10%).

There is a large disparity in the motorcycle industry between China and Taiwan/India in terms of the harshness of price competition. In Taiwan and India, sharp drop in motorcycle price can not be observed during 1990s. But in China, the average price has fallen as much as 40% during the 10 years from the early 1990s, despite the fact that their main products were upgraded from 100cc to 125cc during the same period.

One of the critical technical reasons of Chin's sharp drop in motorcycle prices was that, since 1990s, numerous makers have produced redundantly the "imitations" or "minor-change versions" of small number of standardized (dominant) models (which are originally developed by Japanese makers) (Ohara [2001]). In Taiwan and India, large makers develop and produce their own unique models, and such a blatant and harsh price competition as China experienced among many homogeneous makers has not been observed in the two countries.

IV Comparison of Interfirm Relations in Three Countries

This section compares the interfirm relations between Asian motorcycle makers and their important suppliers. For comparison, we set two ideal

types of interfirm relations, and compare the Asian makers' interfirm relations to them to distinguish their organizational characteristics, similarities, and differences.

An "Integrated-type" is an organization of division of labor where the core maker sets a common target for suppliers, exerting active leadership over them in managing the mechanisms of incentives and monitoring to enhance the capabilities of the network as a whole. It also can be described as "united development type" since they try to upgrade their capabilities in a united manner. "Dispersed-type" is an organization where the leadership of the core maker is weak, with fewer sharing of common goals and information/knowledge, and suppliers are seeking for their own upgrading of capabilities in an isolated manner. We can call it as "isolated development type" as well.

The critical points to classify the two ideal types are following four[2]: 1) "maker's outsourcing structure"; how the maker divides in-house and outsourced parts, 2) "multi-sourcing" and "dependency"; how the maker gives competition to the rival suppliers that supply identical parts to the maker, 3) "risk sharing" and 4) "supplier development activities"; how the maker deal with suppliers directly in transactions. Point 3) shows how the risk arisen in developing new products is shared between them, and point 4) shows what kind of activities makers are initiating to upgrade suppliers' capability.

1 Maker's Outsourcing Structure

Table 3 and 4 show the makers' outsourcing structure, showing the situation at latest surveys and trend of change. Changing direction of

2) This section is based on the analytical framework of Fujimoto [1998].

Table 3 Outsourcing Structure of Asian Makers (1)

		Employee		Outsourcing Ratio	
		2003, 04	change	2003, 04	Change
China	Jialing	6000 (04)	13000 (99)	65-70	
	Zongshen	3900 (04)	↑	90	↓
Taiwan	KYMCO	2900 (04)	60-70	↓	
India	Bajaj	11000 (05)	21000 ('97)	85	50 ('90s)
Japan	Honda	25700*		>80	
	Yamaha	23100*		73	

* including automobile segment

Source : Interview by the author, Annual Report of Bajaj Auto Co. (various years)

Table 4 Outsourcing Structure of Asian Makers (2)

		No. of Suppliers		Affiliated Suppliers	
		2003, 04		no.	foreign collab.
China	Jialing	>300	↓	several	1 (cab.)
	Zongshen	500	↓	several	0
Taiwan	KYMCO	130	=	6	6 (cab. sus, cru. Ele, etc)
India	Bajaj	210	1400 ('97)	non	non
Japan	Honda	200		>30	
	Yamaha	200		several	

Source : Interview by the author, Annual Report of Bajaj Auto Co. (various years)

China in the tables is judged by comparing the first survey in late 1990s and the second survey in 2003-04 (for the detail of China, see Ohara [2006]).

The outsourcing ratios[3] of KYMCO and Jialing are lower than

3) The ratio of purchased material/parts cost to the manufacturing cost. The author acquired this data though his own interviews, however, some of interviewees may be misunderstood the definition.

Japanese makers. Jialing has tendency to produce important parts in-house. KYMCO has established several affiliated suppliers in collaboration with Honda's affiliated Japanese suppliers. However, KYMCO is increasing in-house parts production capabilities such as carburetor, which may be brought about by the recent stagnation of production.

It is noteworthy that Bajaj has fairly high outsourcing ratio, and this is the result of Bajaj's drastic transformation of purchasing policy under "vender rationalization policy". Bajaj used to produce in-house as much as 50% of necessary parts and to purchase the rest from as many as 1400 suppliers in mid 1990s. The outsourcing policy at that time was such that they produce by itself as much as possible, purchase critical parts from foreign affiliated suppliers or import from abroad, and use many suppliers to make unimportant parts. However, from the late 1990s, it began to switch many in-house processing to outsourced parts,[4] and re-organized "flat-layer" type suppliers organization into more "multi-layer" or "hierarchic" type, by selecting capable 1st tier suppliers and arranging many others as 2nd and 3rd under them.[5] The primary aim of this re-organization is to enhance the capability of developing new models (Bajaj Annual Report 2002). By doing so, Bajaj can focus more resources to new model development activities, having more parts development activities outsourced to 1st tier suppliers. With such arrangements, Bajaj put emphasis on initiating activities to upgrade technological capabilities of suppliers.

Compare to KYMCO, Bajaj, and Jialing, Zongshen has fairly higher outsourcing ratio. As stated above, high outsourcing ratio is the result of

4) Suppliers i-3 and i-5 in this study employed staffs who spun-off from Bajaj during the process.

5) Supplier i-7 became 1st tier supplier of muffler unit during the process.

their technological characteristics when they started their business in 1990s. However, it should be noted that, from late 1990s, Zongshen is increasing the kind of parts manufactured/processed in-house.

A common characteristic aspect observed in Chinese two makers is that they use more suppliers than others. The recent number of suppliers they use for Jialing is 300 and 500 for Zongshen, and they used to transact with even larger number of suppliers in the late 1990s. This is the result of their "multi-sourcing" policy, as will be discussed soon. Chinese two makers have few affiliated suppliers, whereas Japanese makers and KYMCO have several affiliated suppliers especially in key parts. In this point, Bajaj does not have capitally affiliated suppliers, either.

2 Multi-Sourcing and Dependency Rate

"Dependency rate" in Table 5 is the (average) ratio of the sales to main transaction partners (4 makers of 3 countries) out of all the sales of main products[6] of the surveyed suppliers. Average dependency of Bajaj's suppliers (to Bajaj) is the highest, 70%, and that of Chinese suppliers is the lowest. The dependency rate of KYMCO is in the middle. Concerning the direction of change of dependency ratio, the figure is in the direction of declining in China and Taiwan, whereas it is increasing in India. The "number of transaction partners" in Table 5 is the number of the maker that the supplier is in a transaction relationship simultaneously. The figure is smallest in India and the highest in China, too. In sum, transaction relationship is the most closed in India, the most open in China, and Taiwan falls in the middle.

6) Not the whole sales of the supplier. If the supplier is selling various kinds of products, the dependency on the maker in sales will be less than the figure appeared in the Table.

Table 5 Multi-sourcing and Dependency

		n	dependency ratio	trend	no. of transaction partners	trend	Multi-suorcing of identical parts		
							single	two	>3
China	Jialing	7	20	↓	10.2	↑	0	4	3
	Zongshen	7	25	↓	21.4	↑	0	3	4
Taiwan	KYMCO	6	48	↓	5.2	—	4	2	0
	(all)	12	47	↓	4.9	—	9	2	1
India	Bajaj	7	71	↑	2.3	—	4	3	0
	(all)	8	75	↑	2.1	—	5	3	0

Source : Interview by the author

As for the situation of multi-sourcing, Bajaj utilizes single-source policy in most cases. This is noteworthy if the maker's recent very rapid expansion of production volume is remembered. By the author's interview, Bajaj said that they use single source policy with suppliers of 80% parts. From maker's perspective, under the single source transaction, the maker can more easily conduct technical evaluation and monitoring of each supplier,[7] and from suppliers point of view, they can make commitment (transaction specific investment) with more confidence. However, since the supplier can enjoy the monopolistic position on the transaction of the parts, for the maker, there is the risk that moral hazard problem occurs in suppliers.

According to the interview at KYMCO, their basic policy is to use two suppliers for one identical parts. However, the most of the suppliers in this survey answered that their transaction with KYMCO is basically done by single-source-base. This may reflect the bias of sample caused by the fact that the suppliers surveyed by this study are mostly producing the critical

7) The maker can secure traceability of problematic parts, as well.

parts and many of them have capital relationships with KYMCO.

In contrast, we could not observe any cases of single-source base transaction in China. Top management of Zongshen said to the author that "If we concentrate our transaction to one supplier, it is often the case that we can not control them. That is why we use two suppliers for every single parts". Jialing also answered in the same way. However, according to suppliers, the two makers often purchase an identical part from more than three suppliers. It is probably because the two-source policy of the top management is not completely penetrated into terminal staffs in charge of purchase for some reason.[8] However, we can also observe the trend that makers are concentrating transactions to smaller number of suppliers in comparison to the late 1990s, having the ratio of two-source transaction become higher than that time.

3 Risk Sharing[9]

Table 6 shows the way of sharing of development cost of new product (motorcycle parts). For the sake of convenience of observation, we discuss mainly the sharing of die/mold cost that occupies a significant part of development cost. In this table, "fully paid by maker" means that the maker with assurance undertakes the depreciation of all the die/mold cost. "Fully paid by supplier" means that the maker does not assure the depreciation[10]. In this case, if the products did not sell well, the loss will

8) According to suppliers, such cases sometimes happen that maker's staffs in charge of purchase pursue personal benefit (bribe) and change arbitrarily the transaction partners.

9) Analytical framework of this section is based on Asanuma [1997].

10) Even when the depreciation of die/mold cost is not assured by the maker, if the new product sells in large enough volume, the supplier can complete the depreciation by adding it into selling price. However, if products do not sell well and could not complete the depreciation, the loss will be undertaken by the supplier that developed the new parts. In this sense, all the development risk is undertaken by suppliers in that case.

Table 6 Risk Sharing

		n	Dev't cost (die/mold)			The risk of dev't failure	Unpayment
			Fully paid by maker	sharing	Fully paid by supplier		
China	Jialing	7	0	3	4	medium	sometimes
	Zongshen	7	1	3	3	high	sometimes
Taiwan	KYMCO	6	5	1	0	low	non
	(all)	12	8	2	2	low	non
India	Bajaj	7	2	1	4	low	non
	(all)	8	3	1	4	low	non

Source : Interview by the author

be undertaken fully by suppliers. In this sense, all the development risk is bored by the supplier. "Sharing" means that, by providing advanced payment or assuring a part of the mold/die cost, they are sharing the risk.

According to Table 6, KYMCO undertakes most of the development risk of suppliers. KYMCO has institutionalized the mechanism of maker's risk absorption, under which suppliers are expected to make more commitment to product development. This is the same way of Japanese makers. Such a system can be manageable only in the situation where makers and suppliers share information/knowledge on the technology that suppliers use, and maker can make proper evaluation of the concrete cost of development based on the shared information.

On the contrary, Chinese makers make suppliers undertake most of the risk. When the development fails (meaning the product does not sell well in the market), suppliers take all the risk. The failure rate of development is high in China. In particular, in the late 1990s, many suppliers answered that the rate of success (meaning the possibility the supplier can

depreciate the development cost) was around 20%. Despite the high failure rate, during the period, since there existed so many suppliers who seek for business opportunities, makers did not find difficulty to find transaction partners. In practice, suppliers also had measures to reduce their risk. Since their products were imitation or minor-change version of dominant models, suppliers could find other makers who would buy them. In addition, suppliers transferred their risks to their own (2^{nd} tier) suppliers in the same way. In 1990s, nonpayment behavior was so widespread over the business. When makers do not make payment to 1^{st} tier suppliers, the suppliers also do not make payment to 2^{nd} tier suppliers. Under such a circumstance, both the makers and suppliers were reluctant to make "transaction specific" investment, and their products become more and more "homogeneous" from parts level. Makers and suppliers were reluctant and actually unable to share technological information/knowledge between them. When defective parts were "found", makers simply returned them without analyzing true causes of the defections (meaning without knowing whether the parts were really defective) and even asked suppliers for compensations. However, it is noteworthy that, in 2003-04, the second survey in China revealed that more firms were beginning to share development cost compared to the late 1990s. Firms were more deliberate and using more systematic method to implement development projects, which made the rate of development failure decrease and had declined the risk of supplier significantly.

The cooperative system between Jialing and important suppliers until early 1990s should be mentioned here.[11] During the period from the early

11) There are good literatures that introduced Jialing's interfirm cooperative system until ↗

1980s to early 90s (around 1993), Jialing had formed and managed with several important suppliers[12] a kind of closed group called "Jialing Motorcycle Economic Complex" (hereafter, "the complex"). The task of member suppliers was to localize the imported key parts of new models that Jialing introduced from Honda. Jialing coordinated the calculation of target cost of suppliers by sharing information with them. When some suppliers failed in achieving the goal, Jialing compensated a part of the losses from the pooled profit within "the complex" where Jialing exerted leadership in re-distributing them. In that sense, unlike after the late 1990s, Jialing had formed interfirm organizations with suppliers (though limited in number) where the maker played a central role in sharing risks among networks, by partly absorbing risks by itself, during 1980s. In the early 1990s, however, Jialing began to seek for maximization of production volume and the complex began to be dissolved.

Concerning India, according to Table 6, Bajaj's suppliers are also undertaking die/mold cost as in the case of Chinese firms. The difference with China is that failure rate of development is very low and nonpayment behaviors were not observed in Bajaj's case. In reality, it would to say that the development costs were virtually born by Bajaj, but the method of the sharing was not well institutionalized as in Taiwan.

4 Supplier Development

Makers can practice "supplier development" activities, by which the maker takes various kinds of measures vis-à-vis suppliers to promote their

early 1990s (Zhongguo Motuoche Gongyeshi Bianji Weiyuanhui ed. [1995] and Zhang [1995]). The description here is mainly based on them but also is supplemented by author's interviews.

12) In 1990, 12 suppliers were listed as formal members of the complex. 5 suppliers (c-3,4,5,6, and 7) out of 7 surveyed by this study used to be the member.

capability upgrading toward the directions that the maker expects (Leenders [1965], Krause [1997]). "Supplier development" activities include direct measures to enhance transaction specific capabilities and indirect ones to develop infrastructural (multi-purpose) capabilities, including technological/financial assistance, personnel exchange, information sharing, stabilization of transactions (for ex. concentration of orders to specific suppliers), etc.

As mentioned above, under "vender rationalization policy", Bajai began to concentrate transactions to smaller number of 1st tier suppliers which have development capabilities. Since then, Bajaj has practiced several activities to nurture them. All the suppliers surveyed by this study participates TPM (total productivity maintenance) activities that Bajaj has initiated since around 2000. Typical case of Bajaj's "supplier development" observed by the study is muffler supplier i-7. Before the policy change, Bajaj used to purchase parts related to exhaustion system from about 100 suppliers. However, from the end of 1990s, Bajaj designated 5 suppliers from them as unit parts (1st tier) supplier, and supplier i-7 came to manage the integration of many 2nd tier suppliers. Along with the change, i-7 accepted financial support at the initial phase and technical support form Bajaj including personnel exchanges. Bajaj also initiates technological learning of i-7 with 2nd tier suppliers.

An interesting point found in the survey about Bajaj's suppliers is that all the 6 metal-processing suppliers surveyed emphasized their effort in raising their own closely related 2nd tier suppliers, and they say some of the 2nd tier suppliers only make transaction with them. It is their endeavor to become superior 1st tier supplier with stable quality and delivery. The effort to raise 2nd suppliers was not very emphasized in the sur-

vey, not only in China, but also in Taiwan. This may suggest that in India, the capacity gap between firms of different tiers in the hierarchy is far larger than in Taiwan and China.

Concerning KYMCO, except for the concentration of order to selected suppliers, concrete cases of the supplier development efforts were not mentioned during the survey. In particular, suppliers evaluate more highly about Taiwan Yamaha's activities, whereas, according to them, KYMCO is not active in supplier development and is not enough technically knowledgeable to do such arrangements effectively.

Several suppliers surveyed by this study include the ones that have capital affiliation from KYMCO, and they accept managers and, in one case (t-4), engineers from the maker. Most of the suppliers surveyed have ever introduced technology from foreign countries, in particular from Japan.[13] It seems that suppliers have strong tendency to pursue their development independently from KYMCO, compared to India's cases.

Concerning Chinese two makers, like KYMCO, not many concrete cases were observed during the survey, in particular in the late 1990s. Until 1980s, Jialing provided supportive actions to the member suppliers of "the complex" including technological training opportunities (via Honda) and financial support. However, in the late 1990s, such cooperative activities were seldom observed. During 1980s, Jialing tried to nurture capable suppliers that could manufacture parts based on the design drawings developed by Honda. However, in 1990s, as many suppliers who had this type of capability emerged, Jialing came to find little necessity to

13) 5 suppliers out of 6 KYMCO's suppliers, and 5 out of 7 other suppliers had technical cooperation (including capital affiliation) with foreign firms.

raise such suppliers by themselves[14]. Jialing, at that time, also pursued massive expansion of production volume, and began to purchase parts from many suppliers since there were few large suppliers that could enough mass production capacity. In the late 1990s, however, disorder of supplier system caused by such changes brought Jialing series of quality problems.

Zongshen, on the other hand, was more active than Jialing in 1990s. Zongshen started to manage "quality assurance system" with its important suppliers with whom they established "Zongshen Group".[15] Under this scheme, Zongshen in collaboration with suppliers make operation standard, and engineers of Zongshen circulate routinely the suppliers and monitor whether or not they are operating properly as designated in the standard. However, in the second survey in 2004, such circulation was interrupted except for c-13. The reasons of interruption was that, since the capability raised by such system is an infrastructural (multi-purpose) capability such as production management, and since suppliers supply similar parts to Zongshen's many rivals, Zongshen found it does not pay for them. In 2004, however, Zongshen started a few new collective schemes in cooperation with important suppliers, including market (dealer) visiting project or discussion with material suppliers. Such collective coordination to enhance technological capability is noteworthy, though, at the time of the survey, they did such activities as ad hoc projects, not "routine" activities institutionalized in ordinary operations.

14) The member suppliers of "the complex" were all public-owned and were tended to be accused as "inefficient", compared to newly emerged firms. In fact, some suppliers also admitted their managerial inefficiency at that time during the surveys.

15) All the 7 suppliers surveyed in this study for Zongshen (c-8-14) were members of the "Zongshen Group".

V Conclusion

In sum, during 2003-05, Bajaj has formed a cooperative interfirm organization with important suppliers that is the closest to typical "integrated type" than Taiwan and China. They shared risks and practiced active supplier development activities and have strengthened their integrity during this several years.

The interfirm relations of KYMCO can also be included as a kind of "integrated type", where the transaction are stable and the rule of the maker's absorption is well institutionalized. However, it is also true that their relationships are more open and supplier development activities are not active. The integrity of the relationships tends to be looser for this several years.

On the contrary, the interfirm relationships of Chinese makers are "dispersed" type, in particular in the late 1990s. Their relationship has been more open and unstable, and the sharing of risks has not been practiced. In particular in 1990s, such tendency was prominent under the circumstances of very frequent failures of development and blatant risk transferring and nonpayment. However, after 2000, the relationship is transforming to the direction of "integrated type", as shown in our observations such as makers' higher concentration of order to less number of suppliers, less prominent risk transferring, and beginning of more systematic supplier development activities.

From the above observations, we now can claim that, at least on the interfirm relationships in motorcycle industry in this decade or so, China has followed a fairly unique path of industrial development compared to Japan, Taiwan, and India.

We then need to proceed to explore the factors that have caused such uniqueness in China, including the influence of the different ways of capability formation both in-house and within network, which will be our next challenge to be tackled with.

Reference

Asanuma, Banri (Kikutani, Tatsuya eds.) 1997. *Nihon no kigyō soshiki kakushin-teki tekiō no mekanizumu : Chōki torihiki kankei no kōzō to kinō* [Mechanisms for innovative adaptation in Japanese company organizations: The structure and function of long-term transaction relationships]. Tokyo : Toyo Keizai Inc.

Chandler, A. J. 1997. *The Visible Hand : The Managerial Revolution in American Business*. Cambridge, Mass. and London : The Belknap Press of Harvard University Press

Chunghua Minkuo Chiche Yenchiu Fachan Anchuan Tsuchin Hsiehhui (CCYAH), ed. 1998. *Taiwan jiche shi* [The history of Taiwan's motorcycle industry]. Taipei : Chunghua Minkuo Chiche Yenchiu Fachan Anchuan Tsuchin Hsiehhui.

Fujimoto, Takahiro. 1998. "Sapuraiyā shisutemu no kōzō, kinō, hassei" [The structure, functions, and formation of supplier systems]. In Fujimoto, Takahiro ; Toshihiro Nishiguchi, and Hideshi Itoh, eds. 1998. *Rīdingusu : sapuraiyā sisutemu ; Atarashii kigyō kankei o tsukuru* [Readings on supplier systems]. Tokyo : Yuhikaku.

Honda Motor Co., Ltd. Various years. *Sekai nirinsha gaikyō* [World motorcycle facts and figures]. Tokyo : Honda Motor Co., Ltd.

Industrial Techno-Economic Services P. Ltd. (INTECOS) and Center for Industrial and Economic Research (CIER). 2001. *Automobile Industry 2001 and Beyond*. New Delhi : INTECOS and CIER.

IRC Co., ed. 2003. *Nihon nirinsha gyōkai no sekai senryaku : 2003* [Global strategy of the Japanese motorcycle industry, 2003]. Tokyo : IRC Co.

Leenders, Michiel R. 1965. *Improving Purchasing Effectiveness through Supplier Development*. Boston : Division of Research, Graduate School of Business Administration, Harvard University.

Ohara, Moriki. 2001. "Chūgoku ōtobai sangyō no sapuraiyā shisutemu : Risuku kanri to nōryoku kōjō sokushin mekanizumu kara mita Nicchū hikaku" [The

supplier system of the Chinese motorcycle industry : A comparative study with the Japanese system in view of the mechanisms of risk management and capability upgrading]. *Ajia keizai* 42, no. 4 : 2–38.

Ohara, Moriki. 2006. *Interfirm Relations under Late Industrialization in China : The Supplier System in the Motorcycle Industry*, Chiba : Institute of Developing Economies.

Shih, Yuh-shyan, and Chen Mei-lynn, ed. *2004 Jiche chanye nianjian* [2004 motorcycle industry yearbook]. Hsinchu : Industrial Economics and Knowledge Center, Industrial Technology Research Institute.

Society of Indian Automobile Manufactures (SIAM) ed. *Profile of the Indian Automoble Industry*, Various years, New Delhi : SIAM.

United Nations. Various years. *Yearbook of Industrial Statistics*. Vol. 2, *Commodity Production Data*. New York : United Nations.

Zhang, Yong. 1995. *Chaoqi Jialing* [*Jialing Rising*]. Beijing : Jingji Ribao-she.

Zhongguo Motuoche Gongyeshi Bianweihui (ZMGB), ed. 1995. *Zhongguo motuoche gongyeshi* [The history of China's motorcycle industry]. Beijing : Renmin Youdina Chubanshe.

Zhongguo Qiche Gongye Nianjian Bianjibu (ZQGNB), ed. *Zhongguo qiche gongye nianjian* [Yearbook of the China's automobile industry]. Various years. Beijing : Zhongguo Qiche Jishu Yanjiu Zhongxin.

Appendix : List of the Suppliers Surveyed

Name of Firm	No. of Employees	Main Product	Main Customer	Capital Relations	Year of Establishment
t-1	200	Meter	KYMCO	Japan	1977
t-2	150	Handle switch (elec.)	KYMCO	KYMCO, Jap.	1980
t-3	75	Switch, Lock	KYMCO		1974
t-4	119	Clutch	KYMCO	KYMCO, Jap.	1992
t-5	468	Shock absorber	KYMCO	KYMCO, Jap.	1969
t-6	289	Carburetor	KYMCO	Jap, KYMCO, SYM	1981
t-7	191	Lock	Yamana T		1982
t-8	109	Engine Geer	Yamana T		1962
t-9	250	Wheel	Yamana T		1974
t-10	95	Rubber tube	Yamana T		1978
t-11	390	Shock absorber	Yamana T	Japan	1964
t-12	80	Frame	SYM		1974
t-13	78	Bearing	non		1981
i-1	500	Ignition Coil	Bajaj	Taiwan	1971
i-2	130	Lamp	Bajaj		1961
i-3	200	Trans. Gear	Bajaj		1999
i-4	72	Frame, Gear case	Bajaj		1984
i-5	50	Engine Gear	Bajaj		1985
i-6	900	Cylinder	Bajaj		1973
i-7	300	Muffler	Bajaj		1974
i-8	2,000	Die Casting Parts	Hero Honda		1986
i-9	260	Battery	TVS	Japan	1970
c-1	280	Electric parts (CDI.)	Jialing		1988
c-2	300	Carburetors	Jialing	Jialing, Jap.	1994
c-3	5,500	Carbur., valve, FWM	Jialing		1964
c-4	1,040	Engines	Jialing		1960
c-5	400	Drum brakes	Jialing		1983
c-6	200	Handling bars	Jialing		1970
c-7	500	Muffler	Jialing	Jialing	1982
c-8	220	Shock absorbers	Zongshen		1986
c-9	500	Crank shafts	Zongshen		1992
c-10	170	Cylinders	Zongshen		1994
c-11	670	Transmission gear	Zongshen		1997
c-12	900	Cylinder heads	Zongshen		1994
c-13	2,000	Crank case	Zongshen		1991
c-14	400	Crank shafts	Zongshen		1984